The Southeast Fishery-Independent Survey

Nate Bacheler

NMFS-Beaufort

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Target species

- Survey targets "snapper-grouper" complex managed by the SAFMC

- Red snapper, vermilion snapper, red porgy, gray triggerfish, gag, scamp, red grouper, black sea bass, etc.

- Many long-lived, hermaphroditic, difficult to sample

- Associated with hardbottom habitats
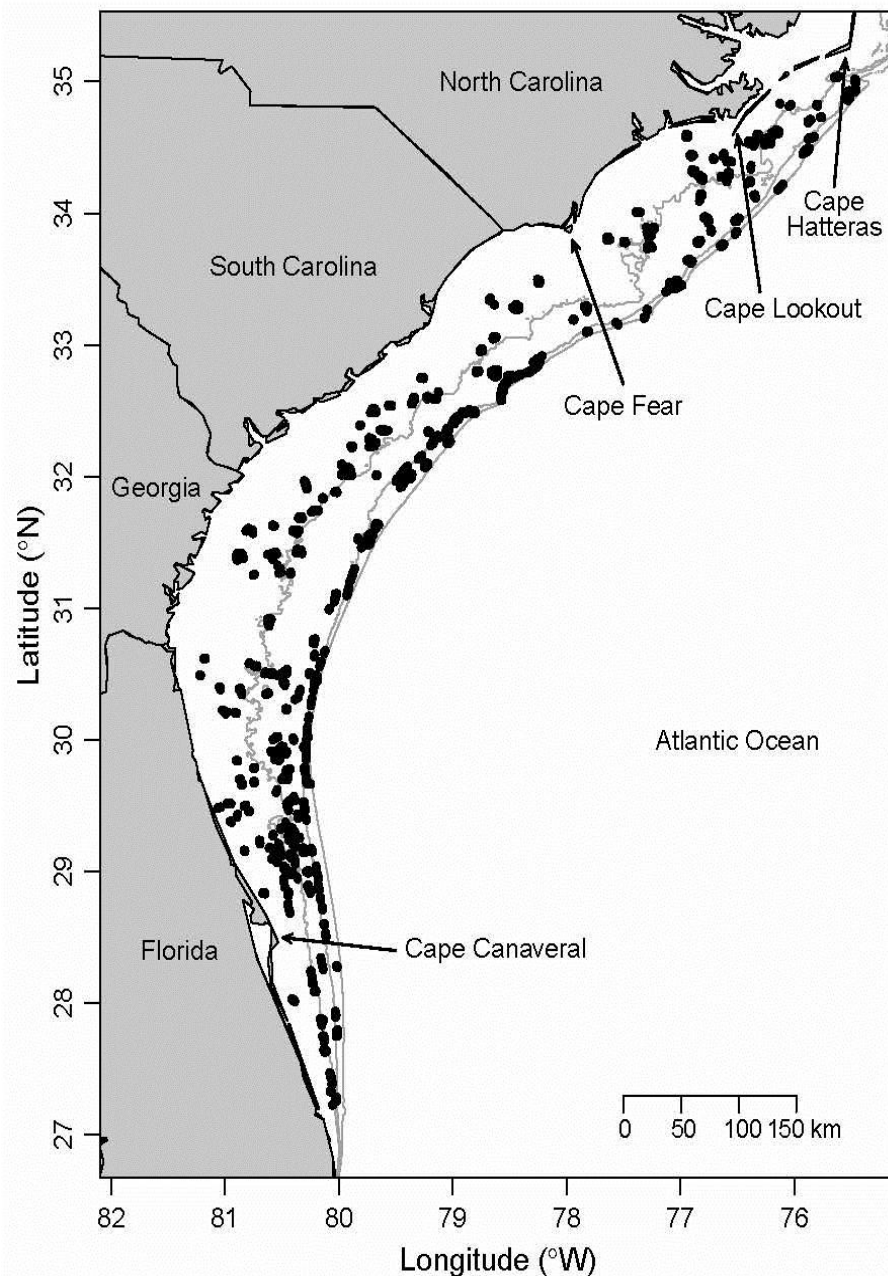
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Background and history

- MARMAP sampling since 1970s

- Run by SCDNR, funded by NMFS

- SEFIS created in 2010 to increase sample sizes, expand sampling, and add video cameras

- SEFIS funded by NMFS - Expand Annual Stock Assessment

- Work cooperatively, identical methods

- Southeast Reef Fish Survey

Experimental design

- Cape Hatteras, NC, to St. Lucie Inlet, FL
- ~15 – 100 meters deep
- Survey targets hardbottom
- Simple random sampling design
- > 200 m apart
- ≤ 6 traps deployed at a time
- Annually, April – October
- ~1500 samples/year

Gears

Chevron traps

- Used since the 1980s
- 1.7 x 1.5 x 0.6 m, 0.91 m^3 vol.
- Baited with 24 menhaden
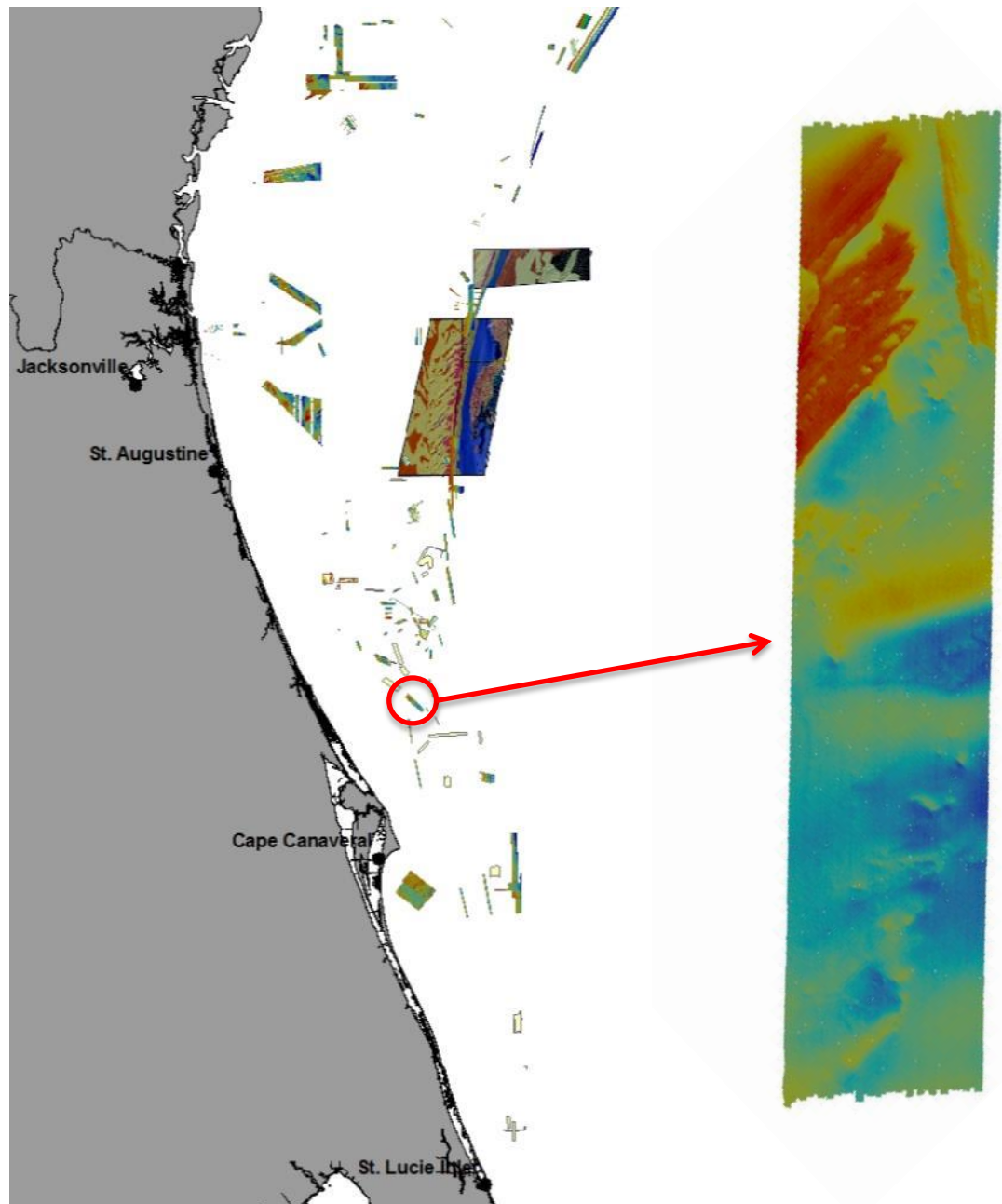- Biological samples, selectivity

Underwater video

- Cameras attached to traps
- Canons over mouth, GoPro on nose
- Both look outward
- Priority species only
- Less selective than traps, but unknown

Sonar mapping

- Use multibeam mapping to expand sampling frame
- NOAA Ships *Nancy Foster* and *Pisces*
- Help from NOS-Office of Coast Survey
- Map at night, ground-truth following day
- Areas chosen based on points from fishermen

Survey outputs

Traps

- Sizes, ages, reproductive information

- DNA

- Mercury

- Diets

- Indices of abundance

Video

- Indices of abundance

- Behavior
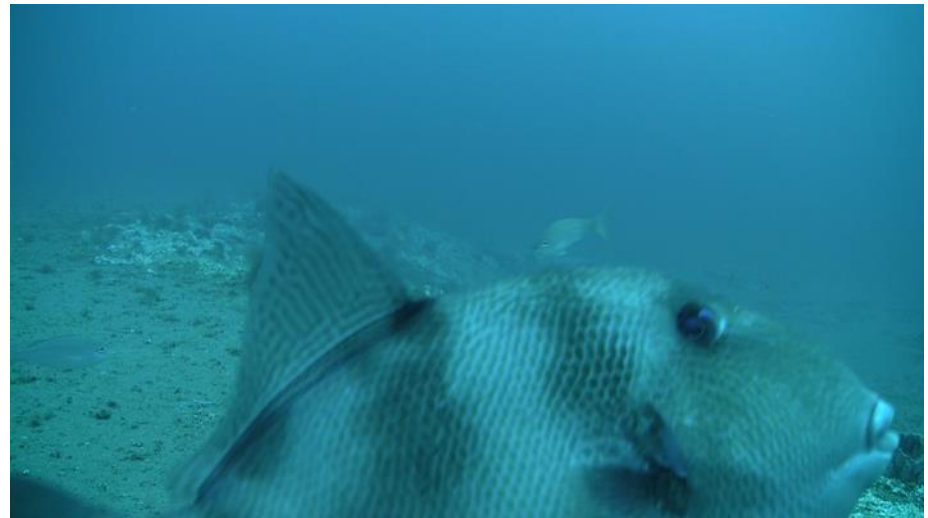
- Habitat, current, water clarity information

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Frequency of occurrence (%)

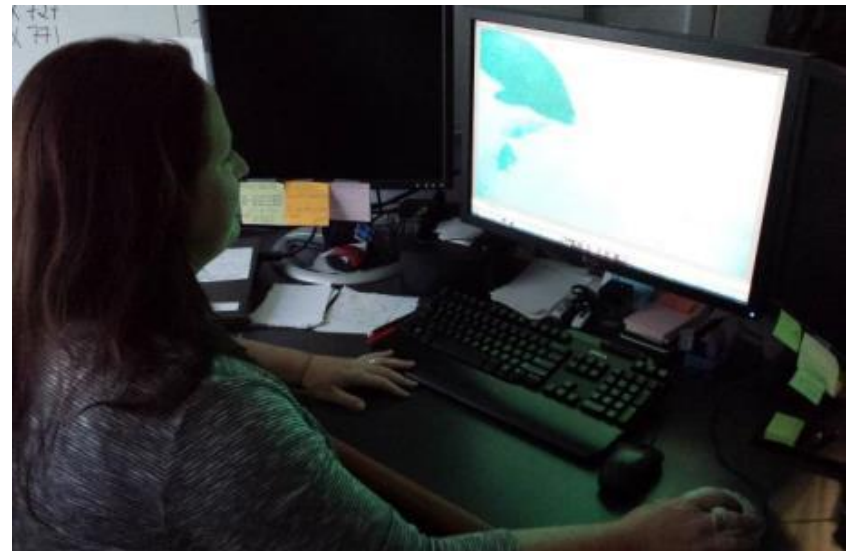| Common name	Scientific name	Video	Traps
Red porgy	*Pagrus pagrus*	43	29
Black sea bass	*Centropristis striata*	31	55
Gray triggerfish	*Balistes capriscus*	29	24
Vermilion snapper	*Rhomboplites aurorubens*	28	17
Red snapper	*Lutjanus campechanus*	22	11
Almaco jack	*Seriola rivoliana*	16	1
Greater amberjack	*Seriola dumerili*	14	0
Scamp	*Mycteroperca phenax*	11	3
Lionfish	*Pterios sp.*	7	0
Gag	*Mycteroperca microlepis*	7	2
White grunt	*Haemulon plumierii*	6	7
Gray snapper	*Lutjanus griseus*	6	0
Hogfish	*Lachnolaimus maximus*	4	0
Banded rudderfish	*Seriola zonata*	3	0
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	2	0
Red grouper	*Epinephelus morio*	2	3

Indices of abundance

- Trap catch and video counts standardized to deal with variability in sampling, habitat, and environmental conditions

- SEDAR 41 - gray triggerfish and red snapper

- CVs: ~15% for video
  ~20-25% for traps

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Costs and logistics

- Days at-sea for charter vessel and staffing are expensive

- Survey is logistically difficult

- Lots of time to process biological samples

- Reading 1500 videos is time consuming (10 readers)

- Staff participate in cruises and read videos

- Equipment: traps, cameras, computers, scales, freezers, bait, etc.

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Research

- Applied and basic research
- Trap and video gear selectivity and catchability
- Inward-looking cameras
- Occupancy models
- *N*-mixture models